



DEKORON®
Unitherm™
Tubing Bundle Experts Since 1962

**Welcome & Thanks
For Attending Our
Webinar**

Dave Doerhoff - National Sales Manager
Power Generation



**GLOBAL LEADER IN HEAT
TRACE PRODUCTS SINCE
1962**



- Part of the \$8 Billion Marmon Group of Companies which is owned by Berkshire Hathaway, \$144 Billion
- Over 50 years history as the world leader in the design & manufacture of pre-insulated tubing and small bore piping
- Pre-insulated tubing and pipe are our only business

Many First's In Our History...



- First to manufacture tubing bundle
- First patents on pre-insulated & traced tubing bundle
- First to produce a field cut CEM bundle
- First Class 1, Div 1 tubing bundle
- First Class 1, Div 2 tubing bundle with power wires

Certifications & Approvals

- **Approved by**

- Factory Mutual
- ATEX



- **Certifications**

- CE
- ISO 9001/2008
- Gost-R



Products

- **Pre-insulated tubing**

Steam transfer lines
Condensate return lines



- **Pre-insulated pipe**

Steam transfer lines
Hot process lines

- **Steam Traced Tubing**

Process analyzers
DP Cells



- **Jacketed Tubing**

Instrument lines
Hydraulic lines

- **Electric Traced Tubing**

Process analyzers
CEM's

Design Conditions

➤ Freeze Protection of

- Instrument lines
- Sampling lines



➤ Temperature Maintenance of

- Small bore transport lines
- Sampling lines



➤ Personal Protection

- Meet OSHA requirement for 140°F max jacket surface temperature

Advantages of Pre-Insulated

- Lower Installed Cost
 - By reducing waste
 - By eliminating intermediate fittings
 - Labor savings
- Pre-Engineered System
 - Has more efficient heat transfer
 - Has consistent thermal characteristics
- Improved Scheduling
 - By reducing craft interference
- Maintenance Free
 - No seams to break down



Our Focus...Power Generation



Coal



EFW
Energy From Waste



Combined Cycle

Our Focus...Power Generation



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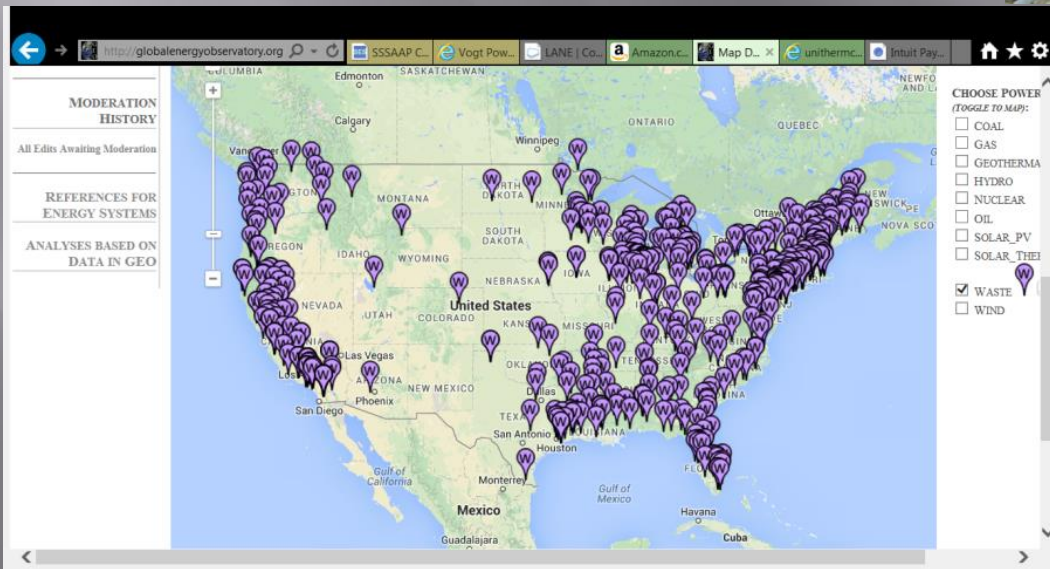
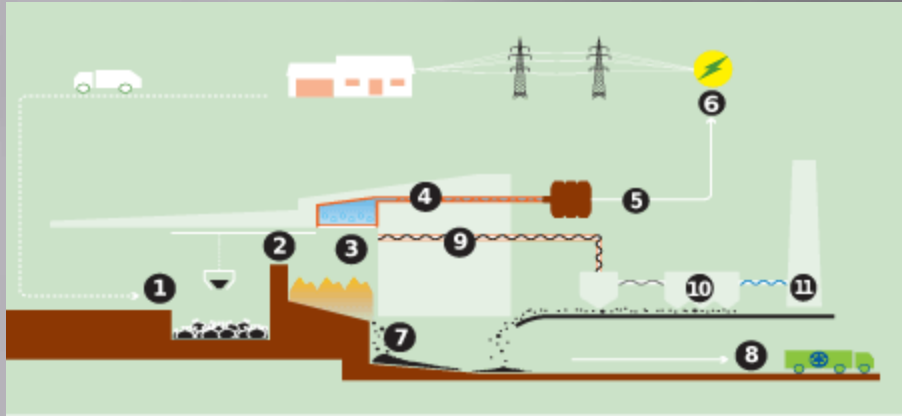
Coal

CEMS



Energy From Waste

CEMS



Cement Plants

CEMS



Buzzi Unicem USA

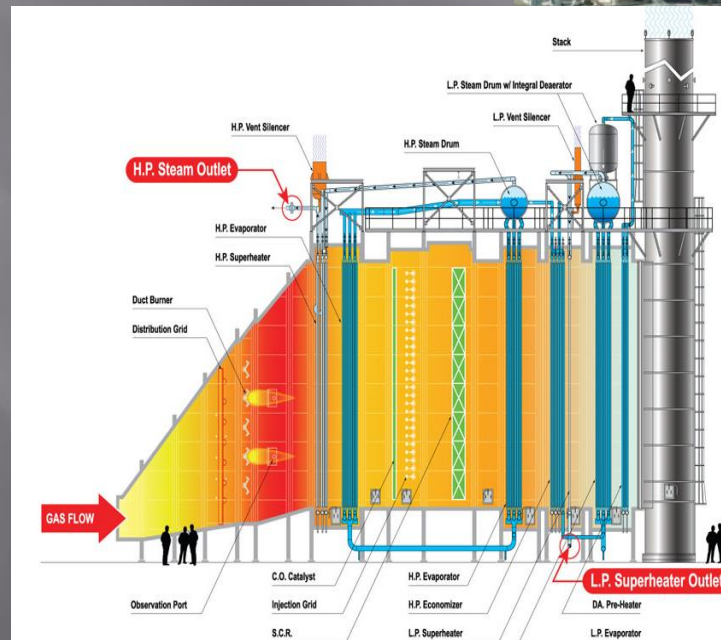


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Combined Cycle Plants

Boiler Sample Lines, Process Bundles & CEMS

- Boiler feed water sampling & analysis from the HRSG
- Instrument & chemical injection lines
- CEMS analysis from stack



Construction & Materials

Tubing

Standard

Sizes

Tubing 1/8" through 3"
Pipe 3" through 24"

Materials

Carbon Steel
304 & 304L wld & smls
316 & 316L wld & smls
316L BPE
Copper
Fluoropolymer
Polypropylene
Teflon

Specialty

Sizes

4mm to 12mm Metric

Materials

316H
Incoloy
Hastelloy
Monel
Low carbon steel



Construction & Materials

Cabled vs Parallel Design

- **Multi-tube bundles are offered in two configurations**
 - **Parallel or Flat-Pack** – 2 to 3 traced tubes are run parallel before taping & extrusion. In order to get proper heat transfer this design limits the number of tubes to 2 or 3 depending on size and temperature. Manufacturers claim the design offers easier installation. This is only true for single plane bends. Multi-plane bends require twisting of the bundle to prevent kinking of inside tube.
 - **Cabled** – 2 to 6 tubes are cabled around the heater or the heater is cabled around the tubes depending on design. Cabling allows for better heat transfer and eliminates the need for special bending on multi-plane installations.



Construction & Materials

Heater

- **MI or mineral insulated** – good to 1,100° exposure requires controller
- **SR or self regulating** – good to 250°F direct contact or 1,100° exposure with buffering
 - Low Temp
 - Hi Temp
- **CPD or constraint power density** – good to 400°F requires a controller and is used for temperature maintenance in CEMS application



Construction & Materials

Insulation

➤ **Fibrous Glass Insulation**

- Industry requirement - less than 100 ppm of water soluble chlorides
- Dekoron Unitherm requirement – less than 30 ppm of water soluble chlorides

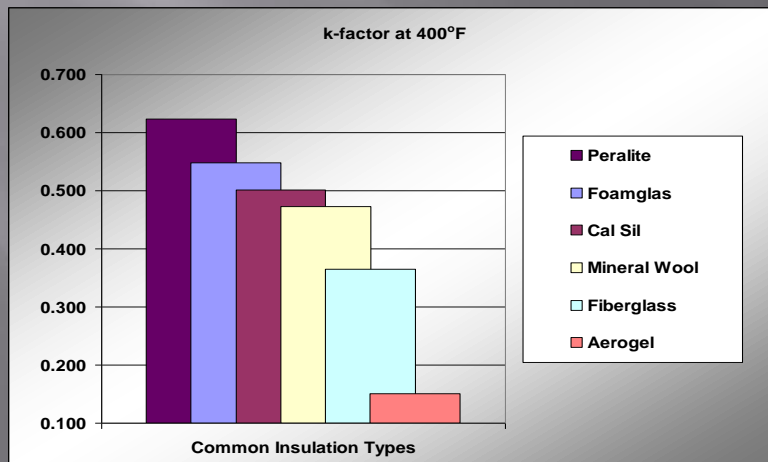


Construction & Materials

Insulation

➤ Aerogel Insulation

- Aerogel's are an amorphous (non-crystalline) silica with 97% of particles larger than 45nm
 - Only the *pores* are nano-scale (~0.01 nm)
 - Aerogel *particles* are much larger
- Amorphous silica has been studied by OSHA, EPA, and the OECD, concluding:
 - “Demonstrated lack of toxicity.”
 - “Is not expected to pose a carcinogenic risk.”
 - “Silica’s are inert when ingested, and unlikely to be absorbed through the skin.”
 - “No concerns for human health.”



Construction & Materials

Insulation

Wrapping of aluminum Mylar over
Cabled tubes and heater



Wrapping of Aerogel over Mylar



Construction & Materials

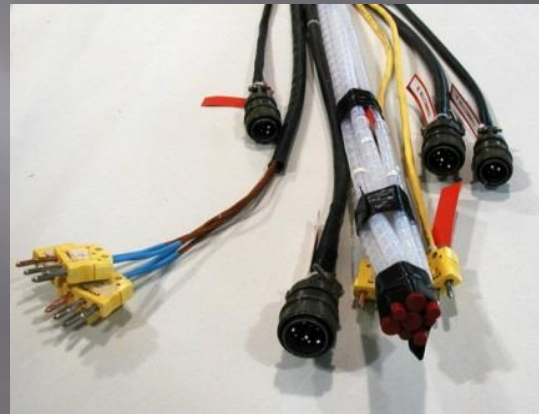
Outer Jacket

- PVC – low cost, easy to install.
- DSJM – Flexible vinyl compound for applications requiring increased flexibility & is halogen free
- TPU – Tends to grab during installation but offers the tightest bend radius' & is halogen free.
- TPE – Thermoplastic elastomer for higher temp applications
- FRPE – Flame retardant polyethylene for maximum durability, chemical resistance, and sub terrain applications & is halogen free



Construction & Materials

End Prep



Stack Tuff

Portable CEMS product

Heavy Duty construction

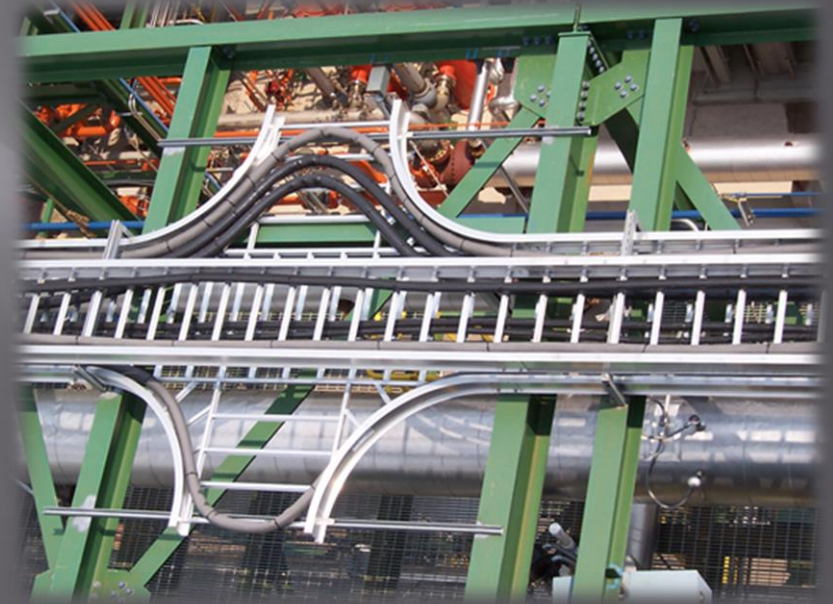
Aircraft cable for easy hanging

Plug-N-Play connections



Bundle Expansion

- **Gravity Fed Sample lines operating above 400°F**
 - The sample temperature within a gravity fed tubing bundle will cool rapidly making expansion only a concern for the first 50'. An additional 1' should be added for the first 50' of run, thereafter no additional bundle is required for expansion.
- **Pressurized bundle operating above 400°F**
 - The tubing bundle requires an additional 1' of length for every 100' of run. This may be accomplished by installing an expansion loop at the midpoint of each run or serpentine the bundle in the cable tray or strut to take up the additional footage. In either case the method of attachment must allow for movement while still anchoring the bundle to the cable tray or strut.



Bend Radius

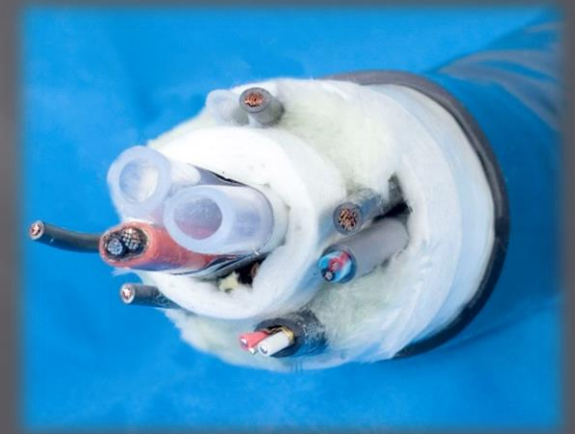


Temperature	1/2" Single Tube	1/2" Dual Tube
250°F	10"	12"
700°F	14"	16"
1100°F	18"	20"

Continuous Emission Monitoring

➤ Stack Gas Monitoring

- Nitrogen Oxides (NO_x)
- Mercury
- Sulfur Oxides (SO_x)
- Carbon Dioxide
- Carbon Monoxide
- Hydrogen Chloride (HCl)
- Methane



Questions?

Thank You!